

# Smart and Automatic Water Distribution Control System

Ayisha Sayed<sup>1</sup>, Shivani Vatkar<sup>2</sup>, Abhishek Udmale<sup>3</sup>, Prof. Vinita Bhandiwad<sup>4</sup>

<sup>1,2,3</sup> Reading BE INFT, VIT, Wadala, Mumbai

<sup>4</sup> Professor, VIT, Wadala, Mumbai

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**Abstract** – As population is increasing day by day, urban residential areas have also increased because of this reasons water has become a critical problem which affects the problem of water distribution, water conservation, water consumption and also interrupted water supply. People are found complaining that they don't have sufficient amount for their daily needs, so to overcome water supply related problems and make system efficient there is need of proper monitoring and controlling system. In this paper, we present design for water monitoring and control approach based on IOT which focuses on continuous and real time monitoring of water supply that enables proper and uniform distribution so that we can have a record of available amount of water in tanks, flow rate abnormality in distribution line. This paper proposes the conceptual design of closed loop automated water distribution system for residential buildings. Here electronic flow rate sensors are fixed in the inlet of every user, when the system is turned on the amount of water utilized by each user is monitored and controlled by using micro controller by counting the pulses from all channels continuously. Depending upon the availability of water in the reserve tanks, the maximum amount of water which is the threshold value will be set for the individual users. The valve can turn on/off by the central control and processing unit to stop the water supply whenever the flow rate exceeds a predefined threshold. There is a computer which is managed in the system to keep the track of the usage of water by individual users in real time and will be handled by the admin to simultaneously manage the users accordingly.

**Key Words:** IOT, Water distribution system, Electronic flow meter, closed loop water system, Arduino UNO, Wi-Fi, Water level sensor, Solenoid valve

## I. INTRODUCTION

Water is one of the most important resource for all the livings on the earth. In that, some people do not obtain sufficient amount of water because of unequal distribution. So, it should be supplied properly as well as carefully and at right time to fulfill the daily activities. The primary objective is to design and develop a low cost, reliable, profitable and efficient technique to make appropriate water distribution by continuous monitoring and also controlling it from central server so as to solve water related complications. This paper gives an idea to help us to provide water in a proper sequential order. In order to implement water distribution system in a appropriate channelized manner to the end users, the control room of each user should be

provided with a micro controller to regulate and control the required quantity of water in proper time interval. The electrically actuated solenoid valve will be shut down automatically when the limit reaches the determined threshold value. With the help of the internal predefined limit in the system, the flow of water through the valve is controlled. The Wi-Fi module is used for wireless communication so that message can be sent to the admin in the central control room.

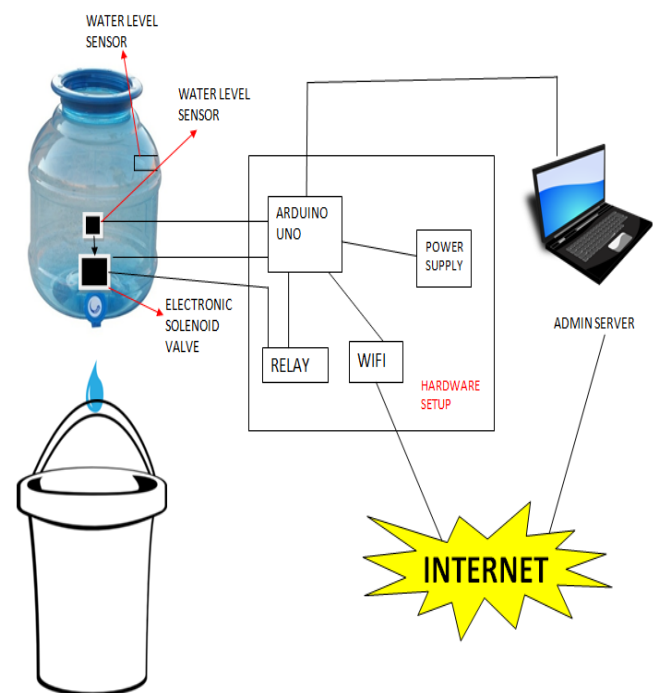


Fig. 1. Design of proposed system

The water system provides utilities with an exceptional ability to understand and control water use. There is a confidence that through this system the water is managed efficiently and is provided according to the demand and unnecessary wastage of water is achieved in real time monitoring.

The water system provides:

- 1) Knowledge- how much water is being used.
- 2) Control- water delivery according to need.

## II. EXISTING SYSTEM

In existing system, water is supplied to home with some manpower. The activity of opening the valve will be performed by the person who is given the charge of it. The person has to wait for a time period and again close the valve. Time consumption is very high in this system. This type of operation needs manpower. Also if operator does not perform the proposed task perfectly then the output of the task will not be good. Also the people may take excess water for their personal use with help of motor or some other equipment. Due to this many people will not receive sufficient water for use. They are standalone instruments and do not have any management over consumption of water. Thus, it works on open loop system.

## III. LIMITATIONS OF EXISTING SYSTEM

The existing system suffers from several limitations like:

- Inefficient monitoring
- No control over utilization of water by users which leads to difficult management of water during the water scarcity periods.
- Water requirement prediction is difficult.
- Users pay a fixed amount even though their consumption varies.
- It requires periodic human intervention for maintenance making it inconvenient and often least effective.

## IV. PROPOSED SYSTEM

The proposed system is fully automated. Hence, human work and time are saved. This system can be implemented on water tanks for safe, efficient and waste less consumption. Water when supplied from the overhead tanks to each flats, the tanks will be checked for its level using level sensors and a threshold will be set for each users according to number of flats. This will be notified to the user i.e. nothing but the limit provided for usage of water.

The level of the tank will be checked for every 1 hour and if the new threshold is greater than the previous threshold then the updated threshold value will be set and notified to the user. Else the same threshold value will be continued for supplying the water. The user will request for the water to the admin server according to the limit allotted to them. The admin server will be switched on for 24 hours daily. The admin will instruct the Arduino to open the valves for the particular user and supply water according to their requirement. The admin will be given control of a web based application consisting of:

- 1) The quantity of water required and consumed by each resident.
- 2) The flow rate measurement using a water flow sensor.

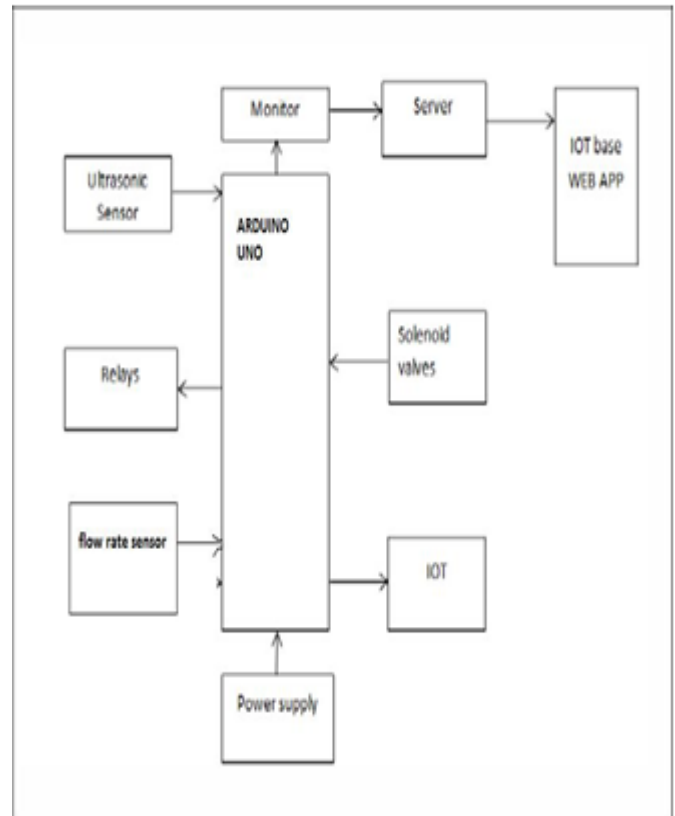


Fig. 2. Block diagram of proposed system [1]

The flow sensors will keep the track of amount of water flowing through each pipeline of the requested user and will automatically shut off the valve when the threshold is reached. During distribution of water rate of flow is measured so that equal distribution is done. This whole data is sent from Wi-Fi to the Web page so that system can be accessed remotely from a computer. The flow of distribution and quantity of water both will be monitored from the web page which can be displayed anywhere using the internet. Hence, the proposed system helps in managing water supply efficiently according to the availability i.e. also under scarce conditions.

## V. ADVANTAGES OF PROPOSED SYSTEM

The proposed system overcomes all the difficulties of the existing system:

- It gives uniform distribution regardless of pressure variation within the pipelines.
- Limits water consumption as per requirements.
- Controls water supply in real time.

- Automated supply ensures that water is not wasted and hence promoting water conservation.
- System is provided with electrical solenoid valve for proper water supply and hence no human intervention.

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**VI. COMPARABLE STUDY OF THESE TWO TECHNOLOGIES**

EXISTING SYSTEMS	PROPOSED SYSTEM
Inefficient monitoring.	Efficient monitoring with the help of central server.
Water requirement prediction is difficult.	Water quantity is fixed for each user.
Human intervention needed for water supply.	Automated supply and hence no manpower required.
Unequal distribution of water.	Uniform distribution of water.
Overconsumption of water	No wastage of water.
Inconvenient as water is supplied for a particular time period.	Convenient as water is supplied as per the need with no time constraint.

**VII. CONCLUSION**

The proposed system helps to monitor and control the consumption of water when it reaches the predefined limit. Automated water distribution focuses on various entities such as proper supply, no wastage, efficient usage, no overconsumption and equal distribution.

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